Causes of the Huron Disaster.

By Prof. Wm. Blasius.

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The whole country mourns for the appalling and terrible disaster that befel the United States war-vessel "Huron" with her hundred brave mariners in the recent storm on our coast. It is not the rareness of such terrible calamities that causes this surprising and deeply felt sympathy with the brave and gallant men who found here so unexpectedly and untimely their watery grave. The Public Ledger of Philadelphia, only a short time ago enumerated 44 vessels belonging to, or bound to, or from American ports only that shared during the short period of one single month a similar fate. Unfortunately such calamities are not seldom on our shore, and they indeed follow each other so rapidly in succession that the last one only obliterates the still vivid traces of the preceding one. Thus they are forgotten one by one, and their stories are only revived for moments, when commerce and pleasure seekers apply to the Government for the removal of the wrecks that are in the way of their pursuits.

What makes, however, this case so particularly impressive in the minds of all men is, that the Huron was a war-vessel, recently built, supposed to be well fitted and found, staunch and speedy, that it was commanded by naval officers who are looked upon as particularly skilled navigators, and understand how to fight the storm as well as the foe, and to whom the nature of the depth in these friendly waters ought to have been as familiar as their state-rooms. We cannot wonder then that the public anxiously inquires into this dreadful and mysterious disaster, and tries to unravel its cause.

Neither is it strange in these corrupt conditions of society that some find it in the defective construction of the vessel; some lay the blame on the commander for having started at sea when the warning signals were flying, and for hugging the coast too closely in order to gain time. Some wise old captains of merchantmen lament the loss of good old practical seamanship; they hint "that the naval officer proper need now be but an indifferent kind of a sailor, so long as he is a good mathematician, chemist or drill-master, appears well, dresses tastefully in well-fitting uniform according to the latest edicts of the naval Turveydrops, and has possessed himself of a diploma issued by the United States Naval Academy." There may be some truth in these suggestions, but it is not likely.

From the meagre facts hitherto published, it will of course be useless to argue any of these surmises; but as the Government doubtless will probe this matter to the bottom for the sake of preventing future similar accidents, I would respectfully draw its attention to a third potent agent which seems to have been completely overlooked by these wise critics, and which probably had more to do with this fearful disaster than the strength of the vessel or the lack of so called seamanship, and this third

agent is the general and lamentable want of a knowledge of the true nature of a storm.

The statements made to the reporter of the New York Herald by Rear Admiral Trenchard, commanding the North Atlantic Station, on board the flagship Powhatan, lying off Fortress Monroe, seems to throw the first two supposed causes almost out of the question. He says: "That on Thursday the vessel was thoroughly inspected by him and his staff, and found to be in first-class order," as only would be expected from a first-class lately built war-vessel. "Captain Ryan," he says, "was a careful and experienced seaman, had surveyed the coast along which he was to pass, and was considered one of the best navigators in the service;" this settles, it seems to me, these two points above all suspicion.

As to the third agent, the storm, which by the general critic has been overlooked, but which the Admiral takes also into consideration, he says: "He sailed at eleven o'clock in the morning, at which time the barometer was not indicating bad weather; was rather above, as shown by the official log." And the surviving officer, Master W. P. Conway, gives us the following information: "At 8 P. M. there was a strong gale blowing, and the sea was running very high. The barometer stood at 30.04 for three hours. The jib-stay was carried away soon after 6 P. M."

The last statements of Admiral Trenchard and Master Conway have reference to the storm and the theories about it, and furnish the key to unravel the cause of this mysterious and sad tragedy. The barometer, the only guide science hitherto has furnished the navigator for his safety was conscientiously consulted; it stood "rather above" the mean, and therefore "did not indicate bad weather."

Captain Ryan, who unfortunately cannot speak any more for his own justification, but who was considered "one of the best navigators in the service, and a careful and experienced seaman," had undoubtedly looked also to this same guide for advice before he started, and finding of course the same answer, was certainly justified in view of the present state of science and good seamanship to start on his voyage in spite of the warning signals flying, the more so as according to the papers these signals had been flying for weeks uselessly and had become, therefore, disregarded generally by seamen. From his high position and reputation, and the testimony Admiral Trenchard bears him, we can neither doubt for one moment that he was fully acquainted with the science of storms and the rules of navigation based on it, and that he had studied the writings of Capper, Thom, Piddington, Reid, Redfield, Dove and others whose views are adopted officially in all navies. The accusation of bad seamanship seems, therefore, unfounded, unjust and cruel, because all these celebrated men of science up to the present time teach, that the storm consists in an area of low pressure, *i. e.*, an area where the barometer stands below 30 inches, and that the navigator, therefore, has to expect a storm or a so called cyclone only when the barometer falls below this mean, but when the barometer stands above he may look for fine and clear weather from the approach of an area

of high barometer or an anti-cyclone. Captain Ryan was, therefore, justified in starting to sea in accordance with the present navigation rules deduced from the generally accepted theory.

In my work, "Storms, their Nature, Classification and Laws" (published two years ago), I think I have demonstrated that this old theory is wrong and worse than useless, that it is illusive and mischievous, and leads often into danger instead of out of it. I showed that the area of low pressure or low barometer is not the storm, but only the effect of the storm, and that the progressive storms (the equatorial and polar storms) of the temperate zone, with which we have principally to deal, consist of two areas of high barometer or rather of two ærial currents of different direction and temperature, which, so to speak, create the area of low barometer between them, by the obliquely upward flowing of the warmer current over the face of the colder. Whether the storm, *i. e.*, this system of two opposing currents of different temperature which displace each other, comes over us with falling or rising barometer depends entirely upon the kind of storm, the state of its development and the position we are in towards these three parts of the storm, facts about which the clouds and the direction of the wind give trustworthy information. The barometer is, therefore, unreliable.

To illustrate this important matter I showed that the heaviest rains and most destructive storms had passed for two days during their earlier development in the form of high pressure through the jurisdiction of the Signal Service Bureau without being recognized as storms, until arriving at the coast—as for instance, the Nova Scotia storm, 1873—they destroyed over a thousand vessels and six hundred lives in almost a single night.

The fact that the barometer stood above the mean height is, therefore, an explanation of why the Huron sailed notwithstanding the Signal Service warnings, but why should she hug the coast? In the absence of the commander the most that can be offered is a plausible conjecture, but it seems probable that his action in this respect was in the belief that this was the safest course for him to take, a belief founded on the rules issued by the Navy Department for maneuvering in such cases.

These "Nautical Rules" instruct the navigator that in storms or cyclones the "manageable semicircle" is on the left side of the path of the centre, *i. e.*, in storms traveling up the Atlantic coast the "manageable semicircle" is on the coast side of the storm, and the "dangerous semicircle" out at sea. And therefore, according to these rules issued for his instruction and guidance, Commander Ryan did perfectly right to keep to the coast so as to be in the "manageable semicircle" of the cyclone. He had to select between two evils—the "dangerous semicircle" and the coast. Had he gone out to sea he would have come in the "dangerous semicircle" and disobeyed these published rules of his department, although as the sequel shows he would have saved himself, crew and ship. These "Nautical Rules" are founded on the dicta of the most eminent meteorological authorities, and strictly in accordance with the science as it now stands, but

when several years ago I asked the accomplished Chief of the Hydrographic Office, Bureau of Navigation, how many vessels he supposed they had saved, he responded: "Not many, I think." It gives me pleasure to state that the same gentleman has lately recommended my work for use in the Navy, saying, "that his experience bears it out."

The fate of the Huron is but another of the many victims to the Moloch of erroneous meteorological theory; it is too much to hope that it will be the last one, but let us trust that such terrible events will grow less and less frequent until the time comes when there may be none fairly chargeable to a lack of a knowledge of the true nature of storms.

Bituminous Material from Pulaski County, Virginia, U. S.

By Dr. Charles M. Cresson.

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The locality from which the sample was taken, is four and a half miles north of the Atlantic, Mississippi and Ohio Railroad property of W. T. Hart, said to be from a vein averaging 32 feet in thickness. Dip variable from 30° to 50°; is covered by 2 feet of fire clay. Footwall, soft gray slate. Sample from 45 feet below water level.

Results of laboratory examination as follows:

Color	Black.
Streak	Brown.
Structure	Lamellar and Friable.
Specific Gravity	1.566.
Moisture and Volatile Matter	7.50 per cent.
Fixed Carbon	65.52 "
Ash	26.98 "

There was no clinker got in the laboratory experiments, although the ash was subjected to a high degree of heat.

Sulphur	0.165 per cent.

One pound of material burned in Oxygen evaporated 10.12 pounds of water from 212° Fahrenheit.

After deducting the average losses, by heat absorbed by ash, products of combustion and radiation, there remains as the result of the combustion of one pound of fuel, 7.59 pounds of water evaporated, or about the same amount as is evaporated by burning one pound of the best coke from bituminous coals.

Experimental trials made in locomotive and stationary tubular boilers, with samples supposed to represent an average of the vein, produced somewhat different results from those obtained from the selected samples sent to the Laboratory for analysis. Upon the large scale, this fuel gave at first an exceeding hot and lively fire, but as soon as the bituminous matter was burned off, the fire became dull and required stirring. When the draft was insufficient to carry off the ash, there was gradually formed a spongy, lava-